

Reinforcement for cement concrete masonry structures shall be measured by the kilogram. The mass of bars shall be the product of the length as shown on the approved plans and schedules and the standard mass per meter of length as adopted by the Concrete Reinforcing Steel Institute. Wire, metal clips, metal chairs or other fastening and supporting devices used for keeping the reinforcement continuous and in correct position will not be considered reinforcement and the Contractor will receive no additional compensation for their use.

The mass of wire mesh (incorporated in the structure) shall be the computed mass in accordance with the plans based on the standard mass accepted by the trade for the unit area of the particular mesh.

901.81 Basis of Payment.

Cement concrete masonry will be paid for at the contract unit price per cubic meter under the particular item of Cement Concrete Masonry of the Class required, as shown on the plans or as directed, complete in place and accepted.

The Contractor shall have no claims for special allowances for extra cement or apparent shrinkage due to inaccurate proportioning or control, bulging of forms, spilling, waste or for any other project conditions within his/her control.

Payment for additional cement required to be used in proportioning by volume and in placing of concrete under water shall be included in the contract unit price paid for the particular designation of cement concrete masonry specified or directed.

When high early strength cement concrete masonry is used (where originally standard cement concrete was specified) by order of the Engineer after the Contract has been executed, the Contractor will be paid in addition to the contract unit price for such standard cement concrete masonry the sum of \$5.00 per cubic meter for all high early strength cement concrete masonry as is so directed to be used. When the contract has specified that high early strength cement concrete shall be used, or if the Contractor is permitted to choose such concrete as an option, then no additional payment will be made for such concrete.

Latex Modified Mortar and Concrete Overlayments will be paid for at the contract unit price per square meter, complete in place and accepted including surface preparation.

Steel reinforcement including wire mesh will be paid for at the contract unit price per kilogram under the item for Steel Reinforcement for Structures, complete in place. No payment will be made for any fastening devices or supports that may be used for keeping the reinforcement in correct position.

Galvanized steel curb bars and steel dowels will be paid for at the contract unit price per kilogram under the item for Steel Reinforcement for Structures.

The work specified under Subsections 901.70, 901.71, 901.72, and 901.73 shall be done without extra compensation except when openings for pipes, wires and conduits are required to be blocked up, the brick masonry will be paid for at the contract unit price per cubic meter of the kind of masonry in which the opening occurs.

Holes for dowels shall be drilled by the Contractor without extra compensation.

901.82 Payment Items.

901.	30 MPa - 40 mm - 335 kg Cement Concrete Masonry	Cubic Meter
902.	25 MPa - 40 mm - 310 kg Cement Concrete Masonry	Cubic Meter
903.	20 MPa - 40 mm - 280 kg Cement Concrete Masonry	Cubic Meter
904.	30 MPa - 20 mm - 390 kg Cement Concrete Masonry	Cubic Meter
904.1	35 MPa - 20 mm - 420 kg Cement Concrete Masonry	Cubic Meter
905.	30 MPa - 10 mm - 425 kg Cement Concrete Masonry	Cubic Meter
906.	35 MPa - 40 mm - 400 kg Cement Concrete Masonry	Cubic Meter
907.	Latex Modified Mortar and Concrete Overlayment	Square Meter
910.	Steel Reinforcement for Structures	Kilogram
910.1	Steel Reinforcement for Structures - Epoxy Coated	Kilogram
911.	Shear Connectors	Lump Sum
999.901	Allowance for High Early Strength Concrete	Cubic Meter

SECTION 930

PRESTRESSED CONCRETE BEAMS

DESCRIPTION**930.20 General.**

This work consists of fabricating, delivering, and placing prestressed concrete beams in accordance with the plans and specifications. The work under this Section shall conform to the relevant requirements of the current AASHTO Standard Specifications for Highway Bridges, and shall be supplemented by the relevant provisions of "The Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products," Prestressed Concrete Institute Publication Number MNL-116-85, except as noted herein.

The horizontal alignment (deviation from a straight line parallel to the centerline of the member) for precast prestressed concrete box and deck beams shall not be more than 3 millimeters per each 5 meters of beam length nor shall it exceed 12 millimeters maximum for butted precast members.

MATERIALS**930.40 General.**

Materials shall meet the requirements specified in the following Subsections of Division III, Materials:

Protective Sealcoat Emulsion	M3.03.3
Bitumen for Expansion End Anchor Rod	M3.05.1
Cement Mortar	M4.02.15
Prestressed Concrete Beams	M4.03.00 thru M4.03.14
Mortar for Filling Keyways	M4.04.0
Anchor Rods	M8.01.6
Strand Chuck	M8.15.0
Elastomeric Bridge Bearing Pads	M9.14.5

The transverse ties shall be single 13 millimeter low-relaxation strands meeting the requirements of AASHTO M 203. The ties shall be supplied with a seamless polypropylene sheath which has corrosion inhibitor grease between the strand and sheath. The location of all strands, both pretensioning and transverse tie, shall be as shown on the plans.

CONSTRUCTION METHODS**930.60 General.**

Prestressed concrete beams shall be installed to the line and grade shown on the plans in accordance with the Contractor's approved erection procedures and in accordance with relevant provisions of these Standard Specifications.

The prestressed concrete beams shall not be shipped for a minimum of 14 days from casting. Beams shall not be stacked on top of each other either at the fabricator's yard, during transit or at the site. At all times blocking shall be located at the center line of bearing of the beam. The bridge seats for the elastomeric bearings shall be prepared in accordance with Section 901.68, C., 4. Bearing Areas for Superstructure Metal.

930.61 Erection.

Within sixty days of the date of the Notice to Proceed, the Contractor shall submit an erection procedure. The submitted method of erection is subject to review, comment, and approval by the Engineer. The method must be submitted with detailed procedures which include drawings and calculations sufficient to enable the Engineer to determine the adequacy of the proposed method.

The preparation and submission of this erection procedure, including the information and calculations to be provided, shall be in accordance with the relevant requirements of Section 960.61, D. Erection, for beams and girders.

The prestressed concrete beams shall be lifted only by the lifting hooks, and the utmost care shall be taken to prevent distortion of the beams during handling, transportation or storage. Under no circumstances are the beams to be handled in other than an upright position. The design of the lifting hooks shall be the responsibility of the Fabricator of the beams. The lifting hooks shall be designed to meet the requirements for lifting devices as specified under Section 960.61, D. Erection.

Suitable spreaders shall be used during lifting so that only a vertical pull will be made on the hooks. A non-vertical lifting force may be permitted if prior written approval is given by the Engineer. This approval will be contingent on the Contractor demonstrating by calculations, prepared by a Professional Engineer registered in Massachusetts, that the beams will not be damaged by the non-vertical lifting force and by documentation that the capacity of the lifting hooks is adequate for the non-vertical lifting force.

930.62 Butted Prestressed Concrete Deck and Box Beams.

A. Beam Layout.

Prior to erection, the location of the beams on the abutments and piers shall be laid out according to the nominal width of the beams as shown on the plans. Each beam will be erected such that the distance from its edge to the corresponding nominal width line shall be as shown on the plans everywhere along the entire length of the beam. After erection, the beam shall lie entirely within the horizontal lines defined by its nominal width for its entire length and shall not infringe on the space allocated for any adjacent beam.

After all beams are erected, the actual overall width of the butted deck assembly shall not deviate from the nominal dimension shown on the framing plan by more than +0, - 30 millimeters.

B. Mortaring Keyways.

The keyways shall not be filled until 28 days have elapsed from casting of the youngest beam in the butted assembly except under the following condition. If the beams have been cast in a continuous sequence and adjacent beams are not more than two days different in age, then keyways may be filled after 14 days have elapsed since casting of the youngest beam.

Mortar (M4.04.0) shall be placed in strict accordance with the manufacturer's recommendations and instructions.

The keyways shall be filled flush to the top of the beams and any vertical misalignment between beams shall be feathered out on a slope of 1:10 (1 vertical to 10 horizontal). Curing shall be performed in strict accordance with the manufacturer's recommendations. The keyways shall not be filled in cold weather when either the ambient temperature or the precast member's temperature is below the mortar manufacturer's recommendation. No localized heating of either the precast members or of the air surrounding the keyway will be permitted in an attempt to reach application temperatures.

No vehicular or construction traffic will be allowed on the bridge until the mortar has attained its full strength.

C. Traverse Tie Tensioning.

Unless shown otherwise on the plans, the ties shall be tensioned to 20 kiloNewtons before the keyways are filled.

After the keyways are filled with mortar (M4.04.0) and the mortar has cured, the ties shall be tensioned to 135 kiloNewtons.

If the plans show that the ties are to be tensioned before mortaring, then the strands shall be tensioned to 135 kiloNewtons with multipolymer (plastic) shims in place as shown on the plans to maintain a uniform joint width. If excessive time elapses between the tensioning of the ties and the mortaring of the keyways, the Contractor shall verify that the 135 kiloNewton post tension force is still in the strand.

D. Closure Pour for Continuity.

Prior to erecting the beams, the restraint key cast into the top of the pier cap shall be lined with closed cell foam to the limits and thickness shown on the plans.

The concrete for the closure pour shall not be placed until after the keyway mortar has cured and the transverse ties have been fully tensioned. The pier cap restraint key shall be cleaned of all loose and extraneous material prior to placing the concrete. Stytofoam shall be placed outside of the restraint key as shown on the plans to prevent the closure pour concrete from coming in contact with the pier cap itself.

E. Final Deck Assembly Work.

After the final deck assembly has been accepted by the Engineer, the lifting hooks shall be cut off below the top of the beam, and the recesses shall be filled with mortar (M4.02.15). The Contractor shall also remove projections and fill all depressions in the tops of the beams with mortar (M4.02.15).

After all mortar has cured, the Engineer shall inspect and approve the surface of the deck assembly before the Contractor will be permitted to apply the membrane waterproofing in accordance with the requirements of Section 965, System 3 - Preformed Sheet Membranes.

F. Backwalls, Curtain Walls and Keeper Blocks.

The backwalls, the curtain walls at the abutment bridge seats, and the keeper blocks shall be cast only after the deck assembly has been accepted. Closed cell foam shall be attached to the bridge structure to the limits and thickness as shown on the plans and the backwall/curtain wall/keeper block concrete shall be placed directly against it.

The sidewalk, safety curb or barrier sections may be cast after the curtain walls and exterior pier keeper blocks have been cast. In this case, the curtain walls and keeper blocks shall be accurately formed above the beams to the shape and dimensions of the coping, including the thickness of the closed cell foam, as shown on the plans. Closed cell foam will be attached to the curtain wall/keeper block prior to placing the coping concrete.

930.63 Prestressed I-Beam, Bulb Tee, and Spread Box Beam Sections.

Anchor bolts, where called for on the plans, shall be set as follows: in piers, anchor bolts shall be accurately set by template prior to placing concrete; in abutments, anchor bolts may be set by template or by drilling and grouting. Grout shall be a non-shrink type.

Keeper blocks on the abutments and pier caps, where called for on the plans, shall be cast after the beams have been erected. Closed cell foam of the thickness shown on the plans shall be attached to sides of the beam within the limits of the keeper blocks prior to placing the concrete.

As beams are being erected, temporary blocking or bracing shall be installed at the ends of the beams to prevent the beams from accidentally rotating and tipping over. The detail for this bracing shall be included with the erection procedure submittal.

After the reinforced concrete diaphragms have been poured and allowed to reach a minimum of 70% of the required 28 day strength, the temporary bracing may be removed. In addition, the placement of the deck concrete will not be permitted until these concrete diaphragms have been installed and have reached this minimum strength.

The top of the beam shall be clean, free of all laitance and shall have a rough surface raked across the width of the beam. Deck concrete shall be placed against the beam concrete without the use of any bonding agents.

COMPENSATION

930.81 Basis of Payment.

The above work shall be paid for at the contract lump sum price under the respective items of Prestressed Concrete Deck Beams, Prestressed Concrete Beams (I or Bulb Section), and Prestressed Concrete Box Beams complete in place and accepted.

930.82 Payment Items.

930.	Prestressed Concrete Deck Beams	Lump Sum	
930.1	Prestressed Concrete Box Beams		Lump Sum
931.	Prestressed Concrete Beams (I or Bulb Section)	Lump Sum	
932.	Elastomeric Bridge Bearing Pad	Square Meter	
933.	Elastomeric Bridge Bearing Pad	Each	

SECTION 940

DRIVEN PILES

DESCRIPTION

940.20 General.

This work shall consist of furnishing and driving piles to the required bearing capacity in accordance with these specifications and in close conformity with the lines and grades shown on the plans established by the Engineer.